

## SEQUENCE LISTING



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## (1) GENERAL INFORMATION:

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- (ii) Title of Invention: Identification of Genetic Targets for Modulation By Oligonucleotides and Generation of Oligonucleotides for Gene Modulation
- (iii) NUMBER OF SEQUENCES: 112
- (iv) CORRESPONDENCE ADDRESS:  
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(D) STATE: PA  
(E) COUNTRY: USA  
(F) ZIP: 19103
- (v) COMPUTER READABLE FORM:  
(A) MEDIUM TYPE: DISKETTE, 3.5 INCH, 1.44 MB  
(B) COMPUTER: IBM  
(C) OPERATING SYSTEM: PC-Windows NT  
(D) SOFTWARE: WORD PERFECT 6.1
- (vi) CURRENT APPLICATION DATA:  
(A) APPLICATION NUMBER: 09/067,638  
(B) FILING DATE: 28-APR-1998  
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- (vii) PRIOR APPLICATION DATA:  
(A) APPLICATION NUMBER: 60/081,483  
(B) FILING DATE: 13-APR-1998
- (viii) ATTORNEY/AGENT INFORMATION:  
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## (2) INFORMATION FOR SEQ ID NO: 1

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1  
CCAGGCGGCA GGACCACT 18

## (2) INFORMATION FOR SEQ ID NO: 2

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2  
GACCAGGCGG CAGACCA 18

## (2) INFORMATION FOR SEQ ID NO: 3

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3  
AGGTGAGACC AGGCGGCA 18

## (2) INFORMATION FOR SEQ ID NO: 4

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4  
CAGAGGCAGA CGAACCAT 18

## (2) INFORMATION FOR SEQ ID NO: 5

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5  
GCAGAGGCAG ACGAACCA 18

## (2) INFORMATION FOR SEQ ID NO: 6

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6  
GCAAGCAGCC CCAGAGGA 18

- (2) INFORMATION FOR SEQ ID NO: 7  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7  
      GGTCAGCAA GCAGCCCCA 18
- (2) INFORMATION FOR SEQ ID NO: 8  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8  
      GACAGCGGTC AGCAAGCA 18
- (2) INFORMATION FOR SEQ ID NO: 9  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9  
      GATGGACAGC GGTCAGCA 18
- (2) INFORMATION FOR SEQ ID NO: 10  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10  
      TCTGGATGGA CAGCGGTC 18
- (2) INFORMATION FOR SEQ ID NO: 11  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11  
      GGTGTTCTG GATGGACA 18
- (2) INFORMATION FOR SEQ ID NO: 12  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12  
      GTGGGTGGTT CTGGATGG 18

- (2) INFORMATION FOR SEQ ID NO: 13  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13  
    GCAGTGGGTG GTTCTGGA 18
- (2) INFORMATION FOR SEQ ID NO: 14  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14  
    CACAAAGAAC AGCACTGA 18
- (2) INFORMATION FOR SEQ ID NO: 15  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15  
    CTGGCACAAA GAACAGCA 18
- (2) INFORMATION FOR SEQ ID NO: 16  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16  
    TCCTGGCTGG CACAAAGA 18
- (2) INFORMATION FOR SEQ ID NO: 17  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17  
    CTGTCCTGGC TGCACAA 18
- (2) INFORMATION FOR SEQ ID NO: 18  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18  
    CTCACCAGTT TCTGTCCT 18

- (2) INFORMATION FOR SEQ ID NO: 19  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19  
    TCACTCACCA GTTTCTGT 18
- (2) INFORMATION FOR SEQ ID NO: 20  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20  
    GTGCAGTCAC TCACCACT 18
- (2) INFORMATION FOR SEQ ID NO: 21  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21  
    ACTCTGTGCA GTCACTCA 18
- (2) INFORMATION FOR SEQ ID NO: 22  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22  
    CAGTGAAGTC TGTGCAGT 18
- (2) INFORMATION FOR SEQ ID NO: 23  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23  
    ATTCCGTTTC AGTGAAGT 18
- (2) INFORMATION FOR SEQ ID NO: 24  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24  
    GAAGGCATTC CGTTTCAG 18

- (2) INFORMATION FOR SEQ ID NO: 25  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25  
 TTCACCGCAA GGAAGGCA 18
- (2) INFORMATION FOR SEQ ID NO: 26  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26  
 CTCTGTTCCA GGTGTCTA 18
- (2) INFORMATION FOR SEQ ID NO: 27  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27  
 CTGGTGGCAG TGTGTCTC 18
- (2) INFORMATION FOR SEQ ID NO: 28  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28  
 TGGGGTCGCA GTATTTGT 18
- (2) INFORMATION FOR SEQ ID NO: 29  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29  
 GGTGTTGGGTC GCAGTATT 18
- (2) INFORMATION FOR SEQ ID NO: 30  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30  
CTAGGTTGGG GTCGCAGT 18

- (2) INFORMATION FOR SEQ ID NO: 31
  - (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31  
GGTGCCCTTC TGCTGGAC 18

- (2) INFORMATION FOR SEQ ID NO: 32
  - (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32  
CTGAGGTGCC CTTCTGCT 18

- (2) INFORMATION FOR SEQ ID NO: 33
  - (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33  
GTGTCTGTTT CTGAGGTG 18

- (2) INFORMATION FOR SEQ ID NO: 34
  - (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34  
TGGTGTCTGT TTCTGAGG 18

- (2) INFORMATION FOR SEQ ID NO: 35
  - (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35  
ACAGGTGCAG ATGGTGTC 18

- (2) INFORMATION FOR SEQ ID NO: 36  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36  
      TTCACAGGTG CAGATGGT 18
- (2) INFORMATION FOR SEQ ID NO: 37  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37  
      GTGCCAGCCT TCTTCACA 18
- (2) INFORMATION FOR SEQ ID NO: 38  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38  
      TACAGTGCCA GCCTTCTT 18
- (2) INFORMATION FOR SEQ ID NO: 39  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 39  
      GGACACAGCT CTCACAGG 18
- (2) INFORMATION FOR SEQ ID NO: 40  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 40  
      TGCAGGACAC AGCTCTCA 18
- (2) INFORMATION FOR SEQ ID NO: 41  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single



- (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 41  
GAGCGGTGCA GGACACAG 18

(2) INFORMATION FOR SEQ ID NO: 42

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 18
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 42  
AAGCCGGGCG AGCATGAG 18

(2) INFORMATION FOR SEQ ID NO: 43

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 18
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 43  
AATCTGCTTG ACCCCAAA 18

(2) INFORMATION FOR SEQ ID NO: 44

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 18
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 44  
GAAACCCCTG TAGCAATC 18

(2) INFORMATION FOR SEQ ID NO: 45

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 18
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 45  
GTATCAGAAA CCCCTGTA 18

(2) INFORMATION FOR SEQ ID NO: 46

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 18
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 46  
GCTCGCAGAT GGTATCAG 18

- (2) INFORMATION FOR SEQ ID NO: 47  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 47  
 GCAGGGCTCG CAGATGGT 18
- (2) INFORMATION FOR SEQ ID NO: 48  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 48  
 TGGGCAGGGC TCGCAGAT 18
- (2) INFORMATION FOR SEQ ID NO: 49  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 49  
 GACTGGGCAG GGCTCGCA 18
- (2) INFORMATION FOR SEQ ID NO: 50  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 50  
 CATTGGAGAA GAAGCCGA 18
- (2) INFORMATION FOR SEQ ID NO: 51  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 51  
 GATGACACAT TGGAGAAG 18
- (2) INFORMATION FOR SEQ ID NO: 52  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 18  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 52  
GCAGATGACA CATTGGAG 18
- (2) INFORMATION FOR SEQ ID NO: 53  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 53  
TCGAAAGCAG ATGACACA 18
- (2) INFORMATION FOR SEQ ID NO: 54  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 54  
GTCCAAGGGT GACATTTT 18
- (2) INFORMATION FOR SEQ ID NO: 55  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 55  
CACAGCTTGT CCAAGGGT 18
- (2) INFORMATION FOR SEQ ID NO: 56  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 56  
TTGGTCTCAC AGCTTGTC 18
- (2) INFORMATION FOR SEQ ID NO: 57  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 57  
CAGGTCTTTG GTCTCACA 18
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- (2) INFORMATION FOR SEQ ID NO: 58  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 58  
    CTGTTGCACA ACCAGGTC 18
- (2) INFORMATION FOR SEQ ID NO: 59  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 59  
    GTTTGTGCCT GCCTGTTG 18
- (2) INFORMATION FOR SEQ ID NO: 60  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 60  
    GTCTTGTTTG TGCCTGCC 18
- (2) INFORMATION FOR SEQ ID NO: 61  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 61  
    CCACAGACAA CATCAGTC 18
- (2) INFORMATION FOR SEQ ID NO: 62  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 62  
    CTGGGGACCA CAGACAAC 18
- (2) INFORMATION FOR SEQ ID NO: 63  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single

(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 63  
TCAGCCGATC CTGGGGAC 18

(2) INFORMATION FOR SEQ ID NO: 64  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 64  
CACCACCAGG GCTCTCAG 18

(2) INFORMATION FOR SEQ ID NO: 65  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 65  
GGGATCACCA CCAGGGCT 18

(2) INFORMATION FOR SEQ ID NO: 66  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 66  
GAGGATGGCA AACAGGAT 18

(2) INFORMATION FOR SEQ ID NO: 67  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 67  
ACCAGCACCA AGAGGATG 18

(2) INFORMATION FOR SEQ ID NO: 68  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 68  
TTTGTATAAA GACCAGCA 18

- (2) INFORMATION FOR SEQ ID NO: 69  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 69  
    TATTGGTTGG CTTCTTGG 18
- (2) INFORMATION FOR SEQ ID NO: 70  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 70  
    GGGTTCTGCTG TTGGGGTG 18
- (2) INFORMATION FOR SEQ ID NO: 71  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 71  
    GTCGGGAAAA TTGATCTC 18
- (2) INFORMATION FOR SEQ ID NO: 72  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 72  
    GATCGTCGGG AAAATTGA 18
- (2) INFORMATION FOR SEQ ID NO: 73  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 73  
    GGAGCCAGGA AGATCGTC 18
- (2) INFORMATION FOR SEQ ID NO: 74  
(i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single

(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 74  
TGGAGCCAGG AAGATCGT 18

(2) INFORMATION FOR SEQ ID NO: 75  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 75  
TGGAGCAGCA GTGTTGGA 18

(2) INFORMATION FOR SEQ ID NO: 76  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 76  
GTAAAGTCTC CTGCACTG 18

(2) INFORMATION FOR SEQ ID NO: 77  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 77  
TGGCATCCAT GTAAAGTC 18

(2) INFORMATION FOR SEQ ID NO: 78  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 78  
CGGTTGGCAT CCATGTAA 18

(2) INFORMATION FOR SEQ ID NO: 79  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 79  
CTCTTTGCCA TCCTCCTG 18

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- (2) INFORMATION FOR SEQ ID NO: 80  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 80  
      CTGTCTCTCC TGCCTGA 18
- (2) INFORMATION FOR SEQ ID NO: 81  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 81  
      GGTGCAGCCT CACTGTCT 18
- (2) INFORMATION FOR SEQ ID NO: 82  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 82  
      AACTGCCTGT TTGCCAC 18
- (2) INFORMATION FOR SEQ ID NO: 83  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 83  
      CTTCTGCCTG CACCCCTG 18
- (2) INFORMATION FOR SEQ ID NO: 84  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 84  
      ACTGACTGGG CATAGCTC 18
- (2) INFORMATION FOR SEQ ID NO: 85:  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 1004 base pairs  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single



(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 85:

GCCTCGCTCG GCGGCCAGT GGTCTGCCG CCTGGTCTCA CCTCGCCATG 50  
GTTCTGTCTGC CTCTGCAGTG CGTCCTCTGG GGCTGCTTGC TGACCGCTGT 100  
CCATCCAGAA CCACCCACTG CATGCAGAGA AAAACAGTAC CTAATAAACA 150  
GTCAGTGCTG TTCTTTGTGC CAGCCAGGAC AGAAACTGGT GAGTGA CTGC 200  
ACAGAGTTCA CTGAAACGGA ATGCCTTCCT TGC GGTGAAA GCGAATTCCT 250  
AGACACCTGG AACAGAGAGA CACACTGCCA CCAGCACAAA TACTGCGACC 300  
CCAACCTAGG GCTTCGGGTC CAGCAGAAGG GCACCTCAGA AACAGACACC 350  
ATCTGCACCT GTGAAGAAGG CTGGCACTGT ACGAGTGAGG CCTGTGAGAG 400  
CTGTGTCCTG CACCGCTCAT GCTCGCCCGG CTTTGGGGTC AAGCAGATTG 450  
CTACAGGGGT TTCTGATACC ATCTGCGAGC CCTGCCCAGT CGGCTTCTTC 500  
TCCAATGTGT CATCTGCTTT CGAAAAATGT CACCCTTGGA CAAGCTGTGA 550  
GACCAAAGAC CTGGTTGTGC AACAGGCAGG CACAAACAAG ACTGATGTTG 600  
TCTGTGGTCC CCAGGATCGG CTGAGAGCCC TGGTGGTGAT CCCCATCATC 650  
TTCGGGATCC TGTTTGCCAT CCTCTTGGTG CTGGTCTTTA TCAAAAAGGT 700  
GGCCAAGAAG CCAACCAATA AGGCCCCCA CCCCAAGCAG GAACCCAGG 750  
AGATCAATTT TCCCGACGAT CTTCTGGCT CCAACACTGC TGCTCCAGTG 800  
CAGGAGACTT TACATGGATG CCAACCGGTC ACCCAGGAGG ATGGCAAAGA 850  
GAGTCGCATC TCAGTGCAGG AGAGACAGTG AGGCTGCACC CACCCAGGAG 900  
TGTGGCCACG TGGGCAAACA GGCAGTTGGC CAGAGAGCCT GGTGCTGCTG 950  
CTGCAGGGGT GCAGGCAGAA GCGGGGAGCT ATGCCAGTC AGTGCCAGCC 1000  
CCTC 1004

(2) INFORMATION FOR SEQ ID NO: 86:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 86:

CAGAGTTCAC TGAAACGGAA TGC 23

- (2) INFORMATION FOR SEQ ID NO: 87:  
    (i) SEQUENCE CHARACTERISTICS:  
        (A) LENGTH: 23 base pairs  
        (B) TYPE: nucleic acid  
        (C) STRANDEDNESS: single  
        (D) TOPOLOGY: linear  
    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 87:  
        GGTGGCAGTG TGTCTCTCTG TTC 23
- (2) INFORMATION FOR SEQ ID NO: 88:  
    (i) SEQUENCE CHARACTERISTICS:  
        (A) LENGTH: 25 base pairs  
        (B) TYPE: nucleic acid  
        (C) STRANDEDNESS: single  
        (D) TOPOLOGY: linear  
    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 88:  
        TTCCTTGCGG TGAAAGCGAA TTCCT 25
- (2) INFORMATION FOR SEQ ID NO: 89:  
    (i) SEQUENCE CHARACTERISTICS:  
        (A) LENGTH: 19 base pairs  
        (B) TYPE: nucleic acid  
        (C) STRANDEDNESS: single  
        (D) TOPOLOGY: linear  
    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 89:  
        GAAGGTGAAG GTCGGAGTC 19
- (2) INFORMATION FOR SEQ ID NO: 90:  
    (i) SEQUENCE CHARACTERISTICS:  
        (A) LENGTH: 20 base pairs  
        (B) TYPE: nucleic acid  
        (C) STRANDEDNESS: single  
        (D) TOPOLOGY: linear  
    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 90:  
        GAAGATGGTG ATGGGATTTC 20
- (2) INFORMATION FOR SEQ ID NO: 91:  
    (i) SEQUENCE CHARACTERISTICS:  
        (A) LENGTH: 20 base pairs  
        (B) TYPE: nucleic acid  
        (C) STRANDEDNESS: single  
        (D) TOPOLOGY: linear  
    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 91:  
        CAAGCTTCCC GTTCTCAGCC 20
- (2) INFORMATION FOR SEQ ID NO: 92:  
    (i) SEQUENCE CHARACTERISTICS:  
        (A) LENGTH: 20 base pairs  
        (B) TYPE: nucleic acid  
        (C) STRANDEDNESS: single  
        (D) TOPOLOGY: linear  
    (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 92:  
        AGTGGTCCTG CCGCCTGGTC 20

- (2) INFORMATION FOR SEQ ID NO: 93  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 93  
      GAACAGCACT GACTGTTT 18
- (2) INFORMATION FOR SEQ ID NO: 94  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 94  
      AGAACAGCAC TGACTGTT 18
- (2) INFORMATION FOR SEQ ID NO: 95  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 95  
      AAGAACAGCA CTGACTGT 18
- (2) INFORMATION FOR SEQ ID NO: 96  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 96  
      AAAGAACAGC ACTGACTG 18
- (2) INFORMATION FOR SEQ ID NO: 97  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 97  
      CAAAGAACAG CACTGACT 18
- (2) INFORMATION FOR SEQ ID NO: 98  
  (i) SEQUENCE CHARACTERISTICS:  
    (A) LENGTH: 18  
    (B) TYPE: nucleic acid  
    (C) STRANDEDNESS: single  
    (D) TOPOLOGY: linear  
  (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 98  
      ACAAAGAACA GCACTGAC 18
- (2) INFORMATION FOR SEQ ID NO: 99

- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 99  
CACAAAGAAC AGCACTGA 18
- (2) INFORMATION FOR SEQ ID NO: 100
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 100  
GCACAAAGAA CAGCACTG 18
- (2) INFORMATION FOR SEQ ID NO: 101
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 101  
GGCACAAAGA ACAGCACT 18
- (2) INFORMATION FOR SEQ ID NO: 102
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 102  
TGGCACAAAG AACAGCAC 18
- (2) INFORMATION FOR SEQ ID NO: 103
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 103  
GCTGGCACAA AGAACAGC 18
- (2) INFORMATION FOR SEQ ID NO: 104
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 104  
GGCTGGCACA AAGAACAG 18
- (2) INFORMATION FOR SEQ ID NO: 105
- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 105  
TGGCTGGCAC AAAGAACA 18
- (2) INFORMATION FOR SEQ ID NO: 106
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 106  
CTGGCTGGCA CAAAGAAC 18
- (2) INFORMATION FOR SEQ ID NO: 107
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 107  
CCTGGCTGGC ACAAAGAA 18
- (2) INFORMATION FOR SEQ ID NO: 108
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 108  
TCCTGGCTGG CACAAAGA 18
- (2) INFORMATION FOR SEQ ID NO: 109
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 109  
GTCCTGGCTG GCACAAAG 18
- (2) INFORMATION FOR SEQ ID NO: 110
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18
    - (B) TYPE: nucleic acid
    - (C) STRANDEDNESS: single
    - (D) TOPOLOGY: linear
  - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 110  
TGTCTGGCT GGCACAAA 18
- (2) INFORMATION FOR SEQ ID NO: 111
- (i) SEQUENCE CHARACTERISTICS:
    - (A) LENGTH: 18

(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 111  
CTGTCCTGGC TGGCACA 18

(2) INFORMATION FOR SEQ ID NO: 112  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 18  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 112  
TCTGTCCTGG CTGGACA 18

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